AMENDMENT TO THE CLAIMS

Replace the claims with the following listing:

1. – 11. (Cancelled)

12) (New) Method for measuring the thermal diffusivity of an object, said method comprising:

subjecting a surface region of an object, whose thermal diffusivity (α_m) has to be determined, to a modulated laser beam or to a modulated beam of a similar heating source while providing a signal (MLS) thereof, a heated spot or area of the surface of the object having a definitive diameter and a fixed intensity distribution profile;

providing a signal (MTS) proportional to a temperature on the heated spot or area;

determining a phase difference or phase shift between the modulated beam signal (MLS) and the resulting modulated temperature signal (MTS);

using said determined phase difference or shift and an associated modulation frequency to work out the thermal diffusivity value (α_m) of said object.

13) (New) Method according to claim 12, wherein said signal (MLS) of said modulated laser beam or modulated beam of a similar heating source is provided by measuring said beam and providing a signal proportional to a beam intensity.

14) (New) Method according to claim 12, wherein at least one modulation parameter is subjected to controlled variation, and wherein the temperature is measured at the center of the heated spot or area.

15) (New) Method according to claim 14, wherein said modulation parameter is frequency.

16) (New) Method according to claim 12, wherein the thermal diffusivity value (α_m) of the object is evaluated by comparison with at least one reference or reference sample whose thermal diffusivity value (α_r) has been determined previously by being subjected to the same measurement method in similar conditions.

17) (New) Method according to claim 16, wherein the modulation frequency of the beam is varied and the variation of the phase shift of the latter with respect to the heating source is recorded for a plurality of modulation frequencies, the value of the thermal diffusivity being determined by measuring the shifting required to superimpose respective curves $\Delta\varphi = F(f)$ obtained for the object and a reference sample in a diagram with logarithmic frequency scale, where $\Delta\varphi$ is the phase shift and f is the modulation frequency.

18) (New) Method according to claim 16, wherein the phase shift between the modulated beam and the corresponding modulated temperature is recorded for the object at a given modulation frequency (f_m), then the value of the modulating frequency (f_r) yielding the same phase shift for the reference is determined and finally the value of the thermal diffusivity (α_m) of the object is computed using the formula: $(\alpha_m) = \alpha_r \times (f_m/f_r)$, the dependence of the phase shift from the modulation frequency for the reference being known or having been previously measured.

19) (New) Method according to claim 16, wherein the modulation frequency (f_m) of the beam applied to the object is varied until the phase shift between the modulated heating beam and the corresponding modulated temperature reaches a predetermined value obtained previously for the reference at a given modulation frequency (f_r) and that the thermal diffusivity value (α_m) of the object is computed using the formula: $(\alpha_m) = (\alpha_r \times f_m)/f_r$, the dependence of the phase shift from the modulation frequency for the reference being known or having been previously measured.

20) (New) Method according to claim 12, wherein the modulated beam signal (MLS) and the modulated temperature signal (MTS) are both measured, successively and possibly repetitively, by measuring path and means.

21) (New) Method according to claim 20, wherein the measuring path and means are the same for both signals.

22) (New) Method according to claim 21, wherein measurement of the modulated beam signal (MLS) and the modulated temperature signal (MTS) is carried out by the same measuring path and means, by masking alternatively the beam signal generator and the temperature signal generator.

23) (New) Method according to claim 21, wherein the measuring path and means include a lock-in amplifier preceded by a preamplifier.

24) (New) Method according to claim 12, wherein the beam is modulated by means of an acousto-optical modulator, or a mechanical chopper, driven by an adjustable generator.

25) (New) Method according to claim 24, wherein the modulated beam signal (MLS) is generated by a light sensor receiving a deviated part of the beam, and wherein the temperature signal (MTS) is generated by an infrared sensor receiving radiation sent out by the heated region or spot of the surface of the analyzed sample and focused by an infrared lens.

26) (New) Method according to claim 25, wherein said light sensor is a photodiode.

27) (New) Method according to claim 25, wherein said deviated part of the beam is light reflected by a lens through which the modulated beam is passing before striking the sample.

28) (New) System for measuring the thermal diffusivity of an object, said system comprising:

a laser device or a similar heating source whose beam is directed towards a region or spot on a surface of said object,

means for modulating said laser or heating beam,

means for generating a signal (MLS) corresponding to said modulated laser or heating beam,

means for generating a signal (MTS) corresponding to a modulated temperature of the region or spot struck by the modulated beam, and

amplifying and measuring means able to determine at least one of a phase

difference or shift between the modulated beam signal (MLS) and the resulting modulated temperature signal (MTS) and a thermal diffusivity value (α_m) of said object based upon said phase shift and associated modulation frequency.

29) (New) System according to claim 28, wherein it is adapted to perform the thermal diffusivity measurement method according to claim 12.

30) (New) Method according to claim 20, wherein the modulated beam signal (MLS) is generated by a light sensor receiving a deviated part of the beam, and wherein the temperature signal (MTS) is generated by an infrared sensor receiving radiation sent out by the heated region or spot of the surface of the analyzed sample and focused by an infrared lens.